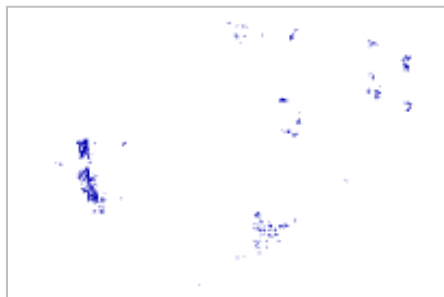


## Excess Bismuth 214 Contours for an Aerial Radiological Survey of Abandoned Uranium Mines on the Navajo Nation



**Data format:** Shapefile

**File or table name:** NN\_Excess\_Bi214\_Contours

**Coordinate system:** Geographic

**Theme keywords:** Excess Bismuth 214, Aerial Radiological Surveys, Gamma Radiation

**Abstract:** This line shapefile provides iso-contours of excess Bismuth 214 in counts per second based upon the 1764keV photopeak. Excess Bismuth 214 is based upon measured minus expected Bismuth 214 times a per flight determined constant equal to a ratio of statistically most likely values. Forty one (41) aerial radiological surveys of potential uranium mining areas (1,144 square miles) were conducted within the Navajo Nation during the period from October 1994 through October 1999. The US Environmental Protection Agency (USEPA) Region 9 funded the surveys and the US Department of Energy (USDOE) Remote Sensing Laboratory (RSL) in Las Vegas, Nevada conducted the aerial surveys. The aerial survey data were used to characterize the overall radioactivity (ground surface exposure rate) and excess Bismuth 214 levels within the surveyed areas.

### FGDC and ESRI Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Spatial Data Organization Information](#)
- [Spatial Reference Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)
- [Binary Enclosures](#)

Metadata elements shown with blue text are defined in the Federal Geographic Data Committee's (FGDC) [Content Standard for Digital Geospatial Metadata \(CSDGM\)](#). Elements shown with green text are defined in the [ESRI Profile of the CSDGM](#). Elements shown with a green asterisk (\*) will be automatically updated by ArcCatalog. ArcCatalog adds hints indicating which FGDC elements are mandatory; these are shown with gray text.

### Identification Information:

**Citation:**

**Citation information:**

**Originators:** Thane Hendricks, Bechtel Nevada, USDOE Remote Sensing Laboratory

**Title:**

Excess Bismuth 214 Contours for an Aerial Radiological Survey of Abandoned Uranium Mines on the Navajo Nation

**\*File or table name:** NN\_Excess\_Bi214\_Contours



**Publication date:** August 2001

**Publication time:** Unknown

**\*Geospatial data presentation form:** vector digital data

**Publication information:**

**Publication place:** Las Vegas, NV

**Publisher:** U.S. Department of Energy

**Other citation details:**

For a detailed description of this survey of the Navajo Nation, see the DOE report: "DOE/NV11718--602" Skey for this document is S03310309.

**\*Online linkage:**

[\\Terra\\_dc\Navajo\NAUM\\_NN\\_Summary\DB\Radiation\NN\\_Excess\\_Bi214\\_Contours.shp](\\Terra_dc\Navajo\NAUM_NN_Summary\DB\Radiation\NN_Excess_Bi214_Contours.shp)

**Description:**

**Abstract:**

This line shapefile provides iso-contours of excess Bismuth 214 in counts per second based upon the 1764keV photopeak. Excess Bismuth 214 is based upon measured minus expected Bismuth 214 times a per flight determined constant equal to a ratio of statistically most likely values.

Forty one (41) aerial radiological surveys of potential uranium mining areas (1,144 square miles) were conducted within the Navajo Nation during the period from October 1994 through October 1999. The US Environmental Protection Agency (USEPA) Region 9 funded the surveys and the US Department of Energy (USDOE) Remote Sensing Laboratory (RSL) in Las Vegas, Nevada conducted the aerial surveys. The aerial survey data were used to characterize the overall radioactivity (ground surface exposure rate) and excess Bismuth 214 levels within the surveyed areas.

**Purpose:**

This dataset was developed to support the U.S. Environmental Protection Agency (USEPA) in its undertaking of an extensive scientific study to determine if abandoned uranium mines (AUM) and related mine features pose a significant risk to human health and the environment, and to identify areas requiring action to reduce risk for the Navajo Nation.

**\*Language of dataset:** en

**Time period of content:**

**Time period information:**

**Range of dates/times:**

**Beginning date:** October, 1994

**Beginning time:** unknown

**Ending date:** October, 1999

**Ending time:** unknown

**Currentness reference:**

ground condition

**Status:**

**Progress:** Complete

**Maintenance and update frequency:** None planned

**Spatial domain:**



**Bounding coordinates:**

- \***West bounding coordinate:** -111.780543
- \***East bounding coordinate:** -108.972132
- \***North bounding coordinate:** 37.160006
- \***South bounding coordinate:** 35.007696

**Local bounding coordinates:**

- \***Left bounding coordinate:** -111.780543
- \***Right bounding coordinate:** -108.972132
- \***Top bounding coordinate:** 37.160006
- \***Bottom bounding coordinate:** 35.007696

**Keywords:****Theme:**

**Theme keywords:** Excess Bismuth 214, Aerial Radiological Surveys, Gamma Radiation

**Theme keyword thesaurus:** None

**Place:**

**Place keywords:** Navajo Nation, Arizona, New Mexico, Utah, United States

**Place keyword thesaurus:** None

**Access constraints:** None

**Use constraints:**

1144 square miles of the more than 25,000 square mile Navajo Nation were surveyed. This area does not include all areas that may have had uranium mining. Specifically, these surveys do not include the Grants Uranium District that is partially on the Eastern Agency of the Navajo Nation.

Use of this data generally requires computer workstations with ESRI's Arc/Info (8.x or above), ArcGIS (8.x or above), or ArcView (3.x), or some other GIS or CAD software that is capable of reading or converting this dataset.

The data are provided "as-is," without warranty of any kind, either express or implied.

These data have been compiled as part of a desktop project to collect existing spatial data to support the study of Navajo abandoned uranium mines. No field verifications were undertaken as part of this desktop study.

**Point of contact:****Contact information:****Contact organization primary:**

**Contact organization:** U. S. Environmental Protection Agency, Region 9, Superfund Program

**Contact address:**

**Address type:** mailing and physical address

**Address:**

75 Hawthorne St (SFD 8-2)

**City:** San Francisco

**State or province:** CA

**Postal code:** 94105

**Country:** USA

**Contact voice telephone:** 415-972-3167

**Security information:**



**Security classification system:** None

\***Native dataset format:** Shapefile

\***Native data set environment:**

Microsoft Windows XP Version 5.1 (Build 2600) Service Pack 2; ESRI ArcCatalog 9.1.0.780

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## Data Quality Information:

### Attribute accuracy:

#### Attribute accuracy report:

Attribute data are from the source data.

### Logical consistency report:

This line shapefile has been visually inspected for extent and number of lines and accuracy of attribute data. In the overlap area of the Red Valley and Red Valley South flight areas, within the Four Corners region, contours of excess Bismuth 214 overlapped. Single contours of a given counts per second for excess Bismuth 214 were selected that provided the best spatial continuity.

### Completeness report:

1144 square miles of the more than 25,000 square mile Navajo Nation were surveyed. This area does not include all areas that may have had uranium mining. Specifically, these surveys do not include the Grants Uranium District that is partially on the Eastern Agency of the Navajo Nation.

### Positional accuracy:

#### Horizontal positional accuracy:

##### Horizontal positional accuracy report:

Aircraft position was established using a Real-time Differential Global Positioning System (RDGPS) and a radar altimeter. The transmitted correction received by the helicopter's GPS unit minimized the relative positional uncertainty to +/- 15 feet (5 meters).

### Lineage:

#### Process step:

##### Process description:

This line shapefile was derived from a series of line shapefiles of counts per second for excess Bismuth 214 by region for the Navajo Nation. These shapefiles were merged into one shapefile and projected to Geographic Coordinates, NAD83.

In the overlap area of the Red Valley and Red Valley South flight areas, within the Four Corners region, contours of counts per second overlapped. Single contours of a given counts per second were selected that provided the best spatial continuity. The attribute CODE was not maintained from the series of shapefiles.

The EXPORATE field was added and populated based on the following formula:

$$\text{COUNTS} / 22.9 = \text{EXPORATE (significant to one decimal place)}$$

The fields "Name" and "Region" were added via a spatial join with the Flight\_Areas.shp shapefile.



**Process software and version:** ESRI ArcGIS 8.3

**Process date:** June 2005

**Process contact:**

**Contact information:**

**Contact organization primary:**

**Contact organization:** TerraSpectra Geomatics

**Contact address:**

**Address type:** mailing and physical address

**Address:**

2700 E Sunset Rd, Ste A-10

**City:** Las Vegas

**State or province:** NV

**Postal code:** 89120

**Country:** USA

**Process step:**

**Process description:**

Dataset copied.

**Source used citation abbreviation:**

**Process step:**

**Process description:**

Dataset copied.

**Source used citation abbreviation:**

**Process step:**

**Process description:**

Dataset copied.

**Source used citation abbreviation:**

**Process step:**

**Process description:**

Dataset copied.

**Source used citation abbreviation:**

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## **Spatial Data Organization Information:**

**\*Direct spatial reference method:** Vector

**Point and vector object information:**

**SDTS terms description:**

**\*Name:** NN\_Excess\_Bi214\_Contours



- \*SDTS point and vector object type: String
- \*Point and vector object count: 4519

#### ESRI terms description:

- \*Name: NN\_Excess\_Bi214\_Contours
- \*ESRI feature type: Simple
- \*ESRI feature geometry: Polyline
- \*ESRI topology: FALSE
- \*ESRI feature count: 4519
- \*Spatial index: TRUE
- \*Linear referencing: FALSE

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## Spatial Reference Information:

### Horizontal coordinate system definition:

#### Coordinate system name:

- \*Geographic coordinate system name: GCS\_North\_American\_1983

#### Geographic:

- \*Latitude resolution: 0.000000
- \*Longitude resolution: 0.000000
- \*Geographic coordinate units: Decimal degrees

#### Geodetic model:

- \*Horizontal datum name: North American Datum of 1983
- \*Ellipsoid name: Geodetic Reference System 80
- \*Semi-major axis: 6378137.000000
- \*Denominator of flattening ratio: 298.257222

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## Entity and Attribute Information:

### Detailed description:

- \*Name: NN\_Excess\_Bi214\_Contours

#### Entity type:

- \*Entity type label: NN\_Excess\_Bi214\_Contours
- \*Entity type type: Feature Class
- \*Entity type count: 4519

#### Entity type definition:

Excess Bismuth 214 for an Aerial Radiological Survey of Abandoned Uranium Mines in the Navajo Nation

#### Attribute:

- \*Attribute label: FID
- \*Attribute alias: FID
- \*Attribute definition: Internal feature number.
- \*Attribute definition source: ESRI



- \*Attribute type: OID
- \*Attribute width: 4
- \*Attribute precision: 0
- \*Attribute scale: 0

**Attribute domain values:**

\*Unrepresentable domain:

Sequential unique whole numbers that are automatically generated.

**Attribute:**

- \*Attribute label: Shape
- \*Attribute alias: Shape
- \*Attribute definition:  
Feature geometry.
- \*Attribute definition source:  
ESRI

- \*Attribute type: Geometry
- \*Attribute width: 0
- \*Attribute precision: 0
- \*Attribute scale: 0

**Attribute domain values:**

\*Unrepresentable domain:

Coordinates defining the features.

**Attribute:**

- \*Attribute label: COUNT
- \*Attribute alias: COUNT
- Attribute definition:  
Counts per second for excess Bismuth 214
- \*Attribute type: Number
- \*Attribute width: 19
- \*Attribute number of decimals: 11

**Attribute:**

- \*Attribute label: EXPORATE
- \*Attribute alias: EXPORATE
- Attribute definition:  
exposure rate in  $\mu$ R/hr
- \*Attribute type: Number
- \*Attribute width: 19
- \*Attribute number of decimals: 11

**Attribute:**

- \*Attribute label: NAME
- \*Attribute alias: NAME
- \*Attribute type: String
- \*Attribute width: 30

**Attribute:**

- \*Attribute label: REGION



\***Attribute alias:** REGION

\***Attribute type:** String

\***Attribute width:** 30

**Attribute:**

\***Attribute label:** Name

\***Attribute alias:** Name

**Attribute definition:**

Flight area name

\***Attribute type:** String

\***Attribute width:** 30

**Attribute:**

\***Attribute label:** Region

\***Attribute alias:** Region

**Attribute definition:**

this field provides the name of the region to which the flight area belongs

\***Attribute type:** String

\***Attribute width:** 30

**Overview description:**

**Dataset overview:**

There are 9747 counts per second contour lines representing the excess Bismuth 214 for an aerial radiological survey of abandoned uranium mines in the Navajo Nation.

**Entity and attribute overview:**

There are three thematic attributes:

COUNT - is the counts per second for Bismuth 214 isotope. Bismuth 214 is a gamma emitter for the uranium decay series, and therefore, an indicator of uranium ore deposits and/or uranium mines. The gamma-ray photopeak at 1760keV, among four Bismuth 214 photopeaks, was used.

EXPORATE - is the exposure rate in  $\mu\text{R/hr}$ , and is calculated from the COUNT field, where  $\text{COUNT}/22.9 = \text{EXPORATE}$

Name - this field provides the name of the flight area

Region - this field provides the name of the region to which the flight area belongs

For additional information contact:

Remote Sensing Laboratory  
Operated by Bechtel Nevada  
for the US Department of Energy.

**Mailing Address:**

U.S. Department of Energy  
National Nuclear Security Administration  
Nevada Operations Office  
P.O. Box 98518  
Las Vegas, NV 89193-8518



Street Address:  
232 Energy Way  
North Las Vegas, NV 89030

Phone:  
702-295-3521

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## Distribution Information:

### Distributor:

#### Contact information:

##### Contact organization primary:

**Contact organization:** U. S. Environmental Protection Agency, Region 9,  
Superfund Records Center

##### Contact address:

**Address type:** mailing address

##### Address:

95 Hawthorne St (SFD-7C)

**City:** San Francisco

**State or province:** CA

**Postal code:** 94105

**Country:** USA

**Contact voice telephone:** 415-536-2033

**Resource description:** Downloadable Data

### Distribution liability:

Although these data have been processed successfully on a computer system for the USEPA, no warranty expressed or implied is made by the USEPA or its contractors regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. No responsibility is assumed by USEPA or its contractors in the use of these data.

### Standard order process:

#### Digital form:

##### Digital transfer information:

\***Transfer size:** 1.836

\***Dataset size:** 1.836

### Custom order process:

Contact the USEPA for a custom order.

### Technical prerequisites:

Use of this data generally requires computer workstations with ESRI's Arc/Info (8.x or above), ArcGIS (8.x or above), or ArcView (3.x), or some other GIS or CAD software that is capable of reading or converting this dataset.

### Available time period:

#### Time period information:

**Single date/time:**

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## Metadata Reference Information:

\***Metadata date:** 20070731

\***Language of metadata:** en

### Metadata contact:

#### Contact information:

##### Contact person primary:

**Contact person:** Andrew Bain

**Contact organization:** U. S. Environmental Protection Agency, Region 9,  
Superfund Program

**Contact position:** Project Manager

##### Contact address:

**Address type:** mailing and physical address

##### Address:

75 Hawthorne St (SFD 8-2)

**City:** San Francisco

**State or province:** CA

**Postal code:** 94105

**Country:** USA

**Contact voice telephone:** 415-972-3167

\***Metadata standard name:** FGDC Content Standards for Digital Geospatial Metadata

\***Metadata standard version:** FGDC-STD-001-1998

\***Metadata time convention:** local time

**Metadata access constraints:** None.

**Metadata use constraints:**

None.

### Metadata security information:

**Metadata security classification system:** None

### Metadata extensions:

\***Online linkage:** <http://www.esri.com/metadata/esriprof80.html>

\***Profile name:** ESRI Metadata Profile

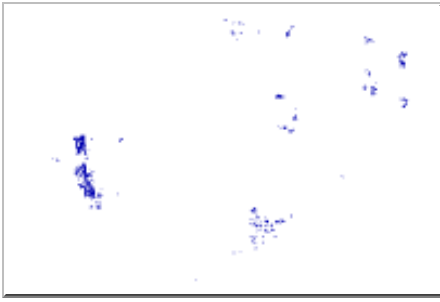
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## Binary Enclosures:

### Thumbnail:

**Enclosure type:** Picture





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